

rent of the battery is obstructed by causing it to pass through the long wire of a galvanometer, or through the electrolyte of a voltmeter, the course of the secondary current from each separate cell is always normal, or in the same direction: when, on the other hand, the battery-current is allowed to flow with the least possible resistance, as by completing the main circuit by a short wire, the secondary current of the separate cells is in the opposite direction. Hence the resistance may be so adjusted as that the secondary current shall altogether disappear, or alternate between the two directions.

The remainder of the paper is occupied with the detail of experiments made with a view to ascertain the effects of different degrees of resistance to the voltaic currents under a great variety of circumstances.

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April 20, 1837.

The Right Honourable the Earl of BURLINGTON, V.P. in the Chair.

Frederic C. Skey, Esq., was elected a Fellow of the Society.

A paper was read in part, entitled, "Observations taken on the Western Coast of North America." By the late Mr. Douglas; with a report on his paper; by Major Edward Sabine, R.A., F.R.S. Communicated by the Right Honourable Lord Glenelg, one of His Majesty's Principal Secretaries of State, F.R.S., &c.

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April 27, 1837.

FRANCIS BAILY, Esq., V.P. and Treas., in the Chair.

M. Antoine César Becquerel, Professor C. G. Ehrenberg, Admiral A. J. Von Krusenstern, and the Chevalier C. F. Mirbel, were elected Foreign Members of the Society.

The reading of Mr. Douglas and Major Sabine's paper, was resumed and concluded.

In the report prefixed to this paper, Major Sabine states, that Mr. Douglas was originally a gardener, and was, in the year 1833, recommended by Sir William Jackson Hooker to the late Mr. Joseph Sabine, who was then Secretary to the Horticultural Society of London, as a fit person to be employed by the Society in selecting and bringing to England a collection of plants from the United States of America. Having accomplished this mission to the complete satisfaction of his employers, he was next engaged on an expedition having similar objects with the former, but embracing a much larger field; namely, the tract of country extending from California to the highest latitude he might find it practicable to attain on the western side of the Rocky Mountains. Anxious to render to geographical and physical science all the services in his power, and to avail himself for that purpose of every opportunity which his visiting these hitherto imperfectly explored regions might afford him, he now endeavoured by diligent application to supply the deficiencies of his previous education. During the three months

which preceded his departure from England, he studied with unremitting ardour and perseverance for no less than eighteen hours each day; and, conquering every difficulty, acquired a competent knowledge of the principles of science, learned the uses of various instruments, and made himself thoroughly master of the methods of taking observations both at sea and on land.

The narrative proceeds to notice the arrival of Mr. Douglas in America, the progress of his undertaking, the loss of his collections and most of his books and papers, by the upsetting and dashing to pieces of the canoe in which he attempted to pass the rapids, and, lastly, his death in 1833, at Owhyhee, in the Sandwich Islands, whither he had proceeded on his return to Europe.

The books which were preserved, and which have been received by Major Sabine, consist of several volumes of Lunar, Chronometrical, Magnetical, Meteorological and Geographical observations, together with a volume of field sketches. The geographical observations of latitude and longitude refer to two distinct tracts of country; first, the Columbia river, and its tributaries; and the district to the westward of them: and, secondly, California. Mr. Douglas very judiciously selected the junctions of rivers, and other well characterized natural points, as stations for geographical determination. The papers containing the details of his magnetical inquiries comprise records of observation of the dip, and of the intensity, at various stations both in North America and in the Sandwich Islands.

“Analysis of the Roots of Equations.” By the Rev. R. Murphy, M.A. Communicated by John William Lubbock, Esq., F.R.S.

The object of this memoir is to show how the constituent parts of the roots of algebraic equations may be determined by considering the conditions under which they vanish; and, conversely, to show the signification of each such constituent part.

The following are the propositions on which the author's investigations are founded.

1. In equations of degrees higher than the second, the same constituent part of the root is found in several places, governed by the same radical sign, but affected with the different corresponding roots of unity as multipliers.

2. The root of every equation, of which the coefficients are rational, contains a rational part; for the sum of the roots could not otherwise be rational. This rational part, as such, is insusceptible of change in the different roots of the same equation; consequently its value is the coefficient of the second term, with a changed sign, divided by the number of roots, or index of the first term.

3. The supposed evanescence of any of the other constituent parts, implies that a relation exists between the roots; and if such a relation be expressed by equating a function of the roots to zero, that constituent part will be the product of all such functions, and a numerical factor.

4. The joint evanescence of various constituent parts, implies the coexistence of various relations between the roots, and that an in-